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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/527,766	06/05/2005	Vladimir Grebenyuk	ION-209US	5195

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EXAMINER	
ALLEN, CAMERON J	
ART UNIT	PAPER NUMBER
1709	

MAIL DATE	DELIVERY MODE
05/29/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/527,766	GREBENYUK ET AL.	
	Examiner	Art Unit	
	Cameron J. Allen	1709	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 June 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22 and 27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *27* is/are allowed.

6)☒ Claim(s) *1-3,5-7,9-12,14,21 and 22* is/are rejected.

7)☒ Claim(s) *4,8,13 and 15-19* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 March 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-3, 5-7, 9-12, 14, and 20-22 is rejected under 35 U.S.C. 102(e) as being anticipated by Wilkins et al (2003/0079992 A1).

Regarding claim 1, Wilkins teaches an electrodeionization (0033) apparatus comprising dilute cells and concentrate cells defined between ion permeable membranes (0033), said dilute and concentrate cells being arranged between an anode electrode and cathode (0034), and configured such that ions present in a flow of feed water passing through a dilute cell are captured by exchange resin and move under influence of an electric potential applied by the electrodes into adjacent concentrate cells (0035), being thereby removed from the flow so as to form an at least partially demonized product water and wherein at least some of the said cells contain a sparse distribution of ion exchange resin (0041). The examiner interprets the mesh in the ion exchange resin to create a sparse distribution. Since the mesh takes up space in the resin containing area it cannot be 100 percent resin, thereby creating a sparse distribution.

Regarding claim 2, Wilkins teaches the ion exchange resin includes beads having a nominal diameter (0057), and the dilute cell has a thickness under about twice diameter(0034), said sparse distribution having a packing density effective to maintain membrane spacing and t effect ion conduction across the cell while providing an effective flow-passing porosity(0036).

Regarding claim 3, Wilkins teaches the sparse distribution is a bed of beads having a thickness of approximately two diameters (0034)

Regarding claim 5, Wilkins teaches the sparse distribution is a bed, a layered bed, a stripped bed a graded bed and a monotype bed. (0034).

Regarding claim 6, Wilkins teaches wherein the sparse distribution is a distribution is stabilized in position by a mesh (0046)

Regarding claim 7, Wilkins teaches wherein the sparse distribution is a distribution of beads and the apparatus contains a screen having a mesh size greater than one bead dimension for stabilizing the filling (0047)

Regarding claim 9 Wilkins teaches a method of filling a EDI cell, such method comprising the steps of assembling a spacer on the first membrane, wherein the spacer defines a fluid flow region adjacent the first membrane (0050). Sprinkling ion exchange beads in the flow region as a sparse distribution, and assembling a second membrane over the spacer thereby forming a sparsely filled cell (0057).

Regarding claim 10, Wilkins teaches providing the mesh in the flow region, the mesh forming a reticulation of strands criss-crossing the flow region such that the mesh segregates and supports the beads of the sparse distribution (0051).

Regarding claim 11, Wilkins teaches the sparse distribution comprised of substantially mutually separate ion exchange beads in the cell for stripping ions from fluid passing through the cell and conduction stripped ions to an adjacent membrane (0039)

Regarding claim 12, Wilkins teaches wherein a substantial portion of said mutually separate ion exchange beads contact both said anion exchange

membrane and said cation exchange membrane (0034 and 0033). Since the layers of resin beads supports the membrane they are in contact.

Regarding claim 14, Wilkins teaches the sparse distribution comprises a monolayer of mixed type ion exchange beads positioned between the anion exchange membrane and the cation exchange membrane (0035)

Regarding claim 20, Wilkins teaches of electrodes configured to apply an electric field transversely to said membranes and providing sparse distribution of ion exchange material between adjacent ones of the membranes (0033)

Regarding claim 21, Wilkins teaches an improved method of purifying fluid by electrodeionization, wherein the improvement is characterized by the step of providing a sparse contributions of ion exchange material in one or more types of cells within an electrodeionization apparatus (0033).

Regarding claim 22, Wilkins teaches the sparse distribution is provided in one or more cells selected from the group of cells consisting of dilute cells, concentrate cells and electrolyte cells, said sparse distribution comprising monotype resin or mixed type resin (0033 and 0034)

3. Claims 1and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Sampson et al (US 6,416,645 B1 A1).

Regarding claim 1, Sampson teaches an electrodeionization (Column 3 line 66) apparatus comprising dilute cells and concentrate cells (column 4 line 3-7) defined between ion permeable membranes (Column 4 line 5 and 6), said dilute and concentrate cells being arranged between an anode electrode and

cathode (Column 4 line 2), and configured such that ions present in a flow of feed water passing through a dilute cell are captured by exchange resin and move under influence of an electric potential applied by the electrodes into adjacent concentrate cells (a), being thereby removed from the flow so as to form an at least partially demonized product water and wherein at least some of the said cells contain a sparse distribution of ion exchange resin (Column 8, 4-6 of fig 1). The examiner interprets the use of bead resin to create voids in the packing material. The voids create a sparse distribution of resin.

Regarding claim 5, Sampson teaches the sparse distribution is a bed, a layered bed, a stripped bed a graded bed and a monotype bed (Abstract)

4. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Giuffrida (4,931,160).

Regarding claim 1, Giuffrida teaches an electrodeionization (column 3, line 1-2) apparatus comprising dilute cells and concentrate cells (column 3 line 68 and column 4 line 1-4) defined between ion permeable membranes (column 3 line 14 and 29), said dilute and concentrate cells being arranged between an anode electrode and cathode (column 4, line 8), and configured such that ions present in a flow of feed water passing through a dilute cell are captured by exchange resin and move under influence of an electric potential applied by the electrodes into adjacent concentrate cells (column 4, line 51-59), being thereby removed from the flow so as to form an at least partially demonized product

water and wherein at least some of the said cells contain a sparse distribution of ion exchange resin (column 4, 16 and column 3 line 13-14).

5. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Liang (5,292,422).

Regarding claim 1, Liang teaches an electrodeionization (column 3, line 30) apparatus comprising dilute cells and concentrate cells (column 3 line 32-33) defined between ion permeable membranes (column 5 line 23), said dilute and concentrate cells being arranged between an anode electrode and cathode (column 5, line 2), and configured such that ions present in a flow of feed water passing through a dilute cell are captured by exchange resin and move under influence of an electric potential applied by the electrodes into adjacent concentrate cells (column 7, line 20-27), being thereby removed from the flow so as to form an at least partially deionized product water (column 11 line 13-14) and wherein at least some of the said cells contain a sparse distribution of ion exchange resin (column 8 line 8). Because of the spacers the ion resin does not occupy 100 percent of the space. The examiner interprets the spacers in the resin to create a sparse distribution.

Allowable Subject Matter

6. Claims 4, 8, 13, and 15-19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. Claim 27 is allowed

8. The following is a statement of reasons for the indication of allowable subject matter:

Claim 4 is indicated as being allowable because the prior art does not teach a layer thickness of diameter.

Claim 8 is indicated as being allowable because the prior art does not teach a fixed on screen by adhesion, electrostatic, magnetic or electronic interaction.

Claim 13 is indicated as being allowable because the prior art does not teach of deforming contact at the surfaces.

Claims 15-19 are indicated as being allowable e because the prior art does not teach of being substantially free of reverse bead junctions.

Claim 27 is allowed because the prior art does not teach wet sieving beads through a screen.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cameron J. Allen whose telephone number is 571-2703164. The examiner can normally be reached on Mon-Fri 8-5 alternate Fri off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Griffin can be reached on 571-272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

CJA

Walter D. Griffin

WALTER D. GRIFFIN
SUPERVISORY PATENT EXAMINER